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16355

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## Polyethylenimine on a Mesoporous Support for CO<sub>2</sub> Removal

### SUMMARY

Presented here is the incorporation and attachment of polyethylenimine (PEI) to a mesoporous silica support.

Polyethylenimine is reported to be one of the cheapest and most effective carbon dioxide (CO<sub>2</sub>) removal agents known. Functionalization to a solid support affords a readily utilized form of PEI for CO<sub>2</sub> removal applications.

While others have attempted to incorporate PEI into mesoporous silica, the surface chemistry (acidity) of the silica causes the PEI to clump, blocking the pores, and thus decreasing the CO<sub>2</sub> adsorption. In this work, we first treat the surface with a monolayer of amine-silane to neutralize the acidity, then treat with PEI, affording the desired PEI coated mesoporous silica.

The resulting material is capable of adsorbing 5-6% CO<sub>2</sub> by weight. It is readily regenerated by heating in an inert atmosphere or under vacuum. Testing has shown the material to maintain its CO<sub>2</sub> capacity over multiple adsorption/regeneration cycles.



U.S. DEPARTMENT OF  
**ENERGY**

### Patents & Intellectual Property

- » U.S. Patent #: 8,138,117

### Technology Portfolio(s)

- » Chemistry

### Potential Industry Applications

- » Aerospace & Defense
- » Energy & Utilities

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